REMARKS/ARGUMENTS

In this amendment claim 3 is amended to include the elements of forming at least part of the conduit from poly(dimethylsiloxane) and having the measurement system include a four-point electrode system that includes two inner electrodes that control voltage applied to the conduit and two outer electrodes that inject current into the particle solution passing through the conduit. Support for forming at least part of the conduit from PDMS can be found in the specification (*e.g.*, at p. 9, lns. 1–4). Support for the four-point electrode system can be found in the specification (*e.g.*, at p. 11, lns. 13–22), the figures showing the inner electrodes positioned external to the conduit (*e.g.*, Figs. 1 & 2, and p. 12, lns. 11–17), and in original claims 8-10.

Upon entry of this amendment claims 1–7, 11–20, 22–35, 37 and 38 will be pending. Reconsideration of the application is respectfully requested in light of the amendment, and the following remarks.

A. The Rejection of the Claim 3 Under §102(b) is Addressed

Claim 3 was rejected under 35 U.S.C. 102(b) over U.S. Patent No. 5,376,878 to *Fisher*. The amendment to claim 3 makes the rejection moot. Claim 3 now incorporates the same elements that caused the rejection of claim 1 over *Fisher* to be withdrawn. Accordingly, withdrawal of the rejection is respectfully requested.

Claim 3 is also amended to include "a four-point electrode system having two inner electrodes and two outer electrodes, wherein the inner electrodes control a voltage applied to the conduit and are positioned external to the conduit, and wherein the outer electrodes inject current into the liquid suspension of particles." One of skill in the art reading *Fisher*, or the other references such as *Hogg* and *Duffey*, would be motivated to make a micro-scale device for sensing and characterizing particles with this electrode system. This four-point electrode system can sense very small currents with low noise that pass through the small conduit. Because the apertures in particle analyzing devices like those described in *Hogg* were much larger in size, one of skill in the art reading the reference would not have had a motivation to develop an electrode system that could sense smaller currents with low noise passing through the aperture.

B. The Rejection of Claims Under §103(a) is Addressed

Claims 1, 2, 4-7, 11-19, 22, 24-29, 31-34, and 37 were rejected under 35 U.S.C. 103(a) over U.S. Pat No. 3,944,917 to *Hogg et al.*, in view of *Duffey et al.* In addition, claims 20 and 35 were rejected under 35 U.S.C. § 103(a) over *Hogg*, *Duffey*, and further in view of U.S. Pat. No. 6,426,615 to *Metha*; and claims 23 and 30 were rejected under § 103(a) over *Hogg*, *Duffey*, and further in view of U.S. Pat. No. 3,919,050 to *Curby*. Applicants respectfully disagree.

To establish *prima facie* obviousness, the Office must establish that one of ordinary skill in the art would have been motivated by prior art teachings to make the claimed invention, and that the practitioner would have had a reasonable expectation of success that the invention would function. The device described in *Hogg* is a conventional table-top particle counter. As noted in the Office Action, *Hogg* did not disclose a conduit that has a cross-sectional area of less than 1 μm^2 or a length less than 10 μm as instantly claimed (*see* Office Action, p. 4, lns. 3-5). For these elements the Office relies on *Duffy* (describing generally the use of PDMS in the fabrication of microfluidic devices), and MPEP § 2144.04 (IV)(A), which states that merely changing the size of a device does not render it patentable over the prior art (*see* Office Action, p. 4, lns. 9-11). However, MPEP § 2144.04 (IV)(A) also notes that the claimed device should not perform differently than the prior art device (*see* MPEP § 2144.04 (IV)(A), citing *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338 (Fed. Cir. 1984)).

This qualification keeps MPEP § 2144.04 (IV)(A) consistent with settled law that a proposed modification to a prior art reference (*e.g.*, changing its size) cannot render the prior art unsatisfactory for its intended purpose (*see* MPEP § 2143.01 (V)). If the proposed modification would render the prior art device unsatisfactory, then there would have been no suggestion or motivation to make the modification, and an obviousness rejection would be improper.

In this case, *Hogg* explicitly warned the reader that changing the dimensions of the aperture beyond certain bounds would interfere with the functioning of the particle-analyzing device. *Hogg* explained that increasing the aperture size too much would lower the resistance of

the aperture to the point where noise will overwhelm the signal current. Similarly, if the size of the aperture is made too small, the resistance of the aperture could increase to the point where too much voltage must be applied to drive a signal current through the aperture. Thus, changing the aperture size can render the particle-analyzing device in *Hogg* unsatisfactory for its intended purpose of analyzing particles passing through the aperture.

Starting at the bottom of col. 12, ln. 67, *Hogg* noted:

> Although the circuits of the invention described above are not dependent upon the diameter of the sensing aperture in a particle-analyzing device, **it is to be understood that there are limits on the diameter size**. In this respect, it is useful to note that the circuits of the invention provide a given current density in an aperture, which density is not dependent upon aperture diameter. If one considers a change by a factor of two in the aperture diameter, one will see that the aperture cross-sectional area, and hence the resistance of the aperture, changes by a factor of four. If the size of the aperture is doubled, for instance, it will have four times the cross-sectional area and hence will have one-fourth the resistance. As a result, four times as much current will flow through the aperture. Four times the current and four times the cross-sectional area result in the same current density. However, it is important to note that the extra cross-sectional area places parallel resistance across the original aperture resistance R_{ap} and injects noise current into the signal detecting amplifier. **Hence, it is not possible to increase the aperture diameter without bound as a point will be reached where the noise current is greater than the signal current.**

Hogg noted that doubling the aperture diameter could render the described analyzer unusable. While the reference did not list dimensions for a typical sized aperture, it referenced a related particle-analyzing device patent that listed a typical aperture diameter on the order of a thousandth of an inch for counting red corpuscles in a solution (*see* U.S. Pat. No. 2,656,508, col. 4, lns. 55-59). A thousandth of an inch translates to about a 25 μm diameter, which is about two orders of magnitude larger than the diameter of a aperture with a cross-sectional area of 1 μm^2. Thus, in light of *Hogg*'s warning not to double the aperture diameter, decreasing the aperture diameter 100-fold would also likely render the particle-analyzing device unsuitable for its intended purpose. Applicants submit that it would not have been obvious to combine the teachings of Hogg and Duffy in the manner proposed by the Office, because Hogg teaches that changes in aperture diameter (include changes much smaller than a 100-fold change

required under the theory proposed by the Office) would interfere with the functioning of the device. Thus, one of skill in the art would not have been motivated by the cited art to make the instantly claimed device.

Moreover, *even if* combined as proposed by the Office, nothing in the cited references would have provided one of skill in the art with a reasonable expectation of success that the claimed device would work. Smaller apertures in particles analyzing devices have larger surface area to volume ratios, which can increase the chance of undesirable particle interactions with the apertures surface (*e.g.*, particle adsorption). There is no description in *Hogg* or *Duffy* about how these problems would be addressed if the size of the device were to decrease by 100-fold or more.

In addition, smaller apertures are more prone to clogging than larger apertures. Debris in the particle solution can easily clog an aperture of a micron-scale size. Larger scale apertures would be large enough to pass this debris without clogging. Neither Hogg nor Duffy describe how clogging problems would be solved if the aperture of the particle analyzing device was reduced to a micron-scale size.

For at least these reasons, the references relied on by the Office do not establish a case of *prima facie* obviousness. Accordingly, the claims are allowable over *Hogg* and *Duffy*, and withdrawal of the rejection of claim 1, 2, 4-7, 11-19, 22, 24-29, 31-34, and 37 under 35 U.S.C. § 103(a) over the references is respectfully requested. For at least the same reason, withdrawal of the rejections of claims 20 and 35 under 35 U.S.C. § 103(a) over *Hogg*, *Duffy* and further in view of *Metha*, and claims 23 and 30 under 35 U.S.C. § 103(a) over *Hogg*, *Duffy* and further in view of *Curby* is also requested.

INTERVIEW REQUEST

Applicants respectfully request an interview with the Examiner to expedite the prosecution of the application.

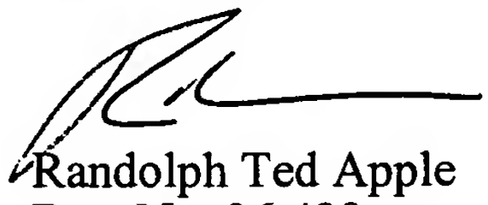
CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 303-571-4000.

Date: 6 March 2006

Respectfully submitted,



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